CFC AND HALON MANAGEMENT

Chlorofluorocarbons (CFCs) and halons are chemicals that have been identified as stratospheric ozone layer depleting substances (ODSs). ODSs may be found in a variety of equipment at parks. These may be owned and serviced by the NPS, concessioners, and contractors. Some commonly found equipment include:

- Chillers, and window or mobile air conditioning units;
- Walk-in, household, and cold storage case refrigerators and freezers;
- Water coolers;
- Halon fire extinguishers and fire suppressant systems; and
- Methyl chloroform and Freon 113 solvent dip tanks and ethylene oxide sterilizers.

Unlike the controversial global warming/climate change issue, there is general agreement on the science of ozone layer depletion caused by ODS releases. One chlorine atom from a CFC can destroy more than 100,000 ozone molecules. The Antarctic ozone hole was documented in the 1980s and data collected in 1994 show measurable ozone layer depletion over North America, including the United States. A diminished stratospheric ozone layer allows more ultraviolet (UV) radiation to reach the earth's surface. Overexposure to UV rays has been shown to contribute to adverse human health and environmental effects such as skin cancer, cataracts, reduced crop yields, and reduced marine growth (e.g., plankton).

Stratospheric or "good" ozone should not be confused with smog-related ozone in the lower atmosphere. Human-made sources such as vehicle emissions contribute to this "bad" ozone that can be harmful to breathe.

Auditor's Guidelines:

Records to Review

- State and local air pollution control regulations
- Inventory of CFC-containing materials
- Emission monitoring reports
- Notice of Violations from regulatory authorities
- Training records and certification pertaining to refrigerant reclaiming/recovery

Features to Observe

- Refrigeration reclaiming/recovery units and certification labels
- Boneyards or equipment storage sites for old air conditioners or refrigerators

Persons to Contact

- CFC technician
- Auto mechanic
- Building and utilities staff

DEFINITIONS

Chlorofluorocarbon (CFC): A compound consisting of chlorine, fluorine, and carbon. CFCs are broken down by strong ultraviolet light in the stratosphere and release chlorine atoms that then deplete the ozone layer. CFCs are commonly used as refrigerants, solvents, and foam blowing agents. The most common CFCs are CFC-11, CFC-12, CFC-113, CFC-114, and CFC-115. A table of all ozone-depleting substances is available at http://www.epa.gov/ozone/ods.html. The table shows their ozone depletion potential (ODP).

Class I Ozone Depleting Substances (ODSs): ODSs with the highest ozone depletion potential (ODP). They include CFCs (e.g., Freon 12), halons, carbon tetrachloride, methyl chloroform, hydrobromofluorocarbons (HBFCs) and methyl bromide. A production ban on these substances was implemented in 1995.

Class II ODSs: ODSs with a lower but still significant ODP compared to Class I ODSs. They consist of hydrochlorofluorocarbons (HCFCs) (e.g., HCFC-22). Complete production phase-out for these materials is scheduled for the year 2030.

Halons: Class I ODS gases that may be used in fire suppressant systems including handheld fire extinguishers and large room or building systems. Halons act as an oxygen displacer. They are often used in computer and other equipment areas. Since they are oxygen displacers, it can be life threatening to enter a room where the fire suppressant system has been recently discharged. Common halons include Halon 1211, Halon 1301, and Halon 2402.

Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs): Common substitutes for ODSs that have no ozone depletion potential but may cause global warming. There is currently no production phase-out planned for these materials.

HVAC: Heating, ventilating, air conditioning unit.

MVAC: Motor Vehicle Air Conditioner. Some regulatory requirements apply specifically to the handling of refrigerants used in motor vehicles.

Recover: To remove refrigerant in any condition from equipment and store it in an external container without necessarily testing or processing it in any way.

Recycle: To remove impurities and oil from refrigerant, and then recharge the same refrigerant into either the same unit or a different unit.

Reclaim: To remove all oil and impurities beyond that provided by on-site recycling equipment. Can be accomplished by the manufacturer or a reclamation facility.

Refrigerant: Chemical used in air conditioning and refrigeration, which can efficiently transfer heat when moving from one physical state to another (i.e., liquid to gas). Refrigerants include CFCs, HCFCs, and ammonia.

Refrigerant Oil: Lubricating oil contained in the air-conditioning/refrigerator compressor. This oil is carried by the refrigerant through the system; as a result, spent refrigerant oil contains refrigerant that must be recovered and reclaimed.

Technician: Any person who performs maintenance, service, repair, or disposal activities that could be reasonably expected to release Class I or Class II ODSs from appliances, except for MVACs, into the atmosphere. Activities

reasonably expected to release ODSs include attaching and detaching hoses and gauges to and from the appliance to add or remove refrigerant or to measure pressure, and adding refrigerant to, and removing refrigerant from, the appliance. Activities such as painting the appliance, re-wiring an external electrical circuit, replacing insulation on a length of pipe, or tightening nuts and bolts on the appliance are **not** reasonably expected to violate the integrity of the refrigerant circuit.

LEGAL REQUIREMENTS

Federal

40 Code of Federal Regulations (CFR) Part 82, Protection of Stratospheric Ozone
These regulations establish requirements related to ODSs in accordance with the Clean Air Act Amendments of 1990. These include the phase-out of ODS production, ODS sales restrictions, prohibition of nonessential ODS uses, labeling of ODS containers and equipment, establishment of maximum allowable leak rates, servicing requirements for ODS-containing equipment, and service technician and equipment certification requirements.

Executive Order 13148 - Greening the Government Through Leadership in Environmental Management
Section 206 *Reductions in Ozone-Depleting Substances.*
This section of the E.O. calls for reductions in the use of ODSs. Federal agencies are directed to evaluate present and future uses of ODSs and to maximize the purchase and the use of safe, cost effective, and environmentally preferable alternatives. The E.O. instructs each agency to develop a plan to phase out the procurement of Class I ozone-depleting substances for all non-excepted uses by December 31, 2010.

State and Local

It is important to check with state and local authorities for regulations affecting ODS management. Many have more stringent requirements than those of the federal government. For example, Wisconsin, and parts of Texas and southern California have lower allowable leak rates than those stipulated under the federal program.

COMPLIANCE REQUIREMENTS

Following is a summary of regulatory topics regarding CFCs that would likely be applicable at NPS facilities:

Allowable Leak Rates

Maximum allowable leak rates have been established for ODS-containing equipment with over 50 pounds of refrigerant. Equipment should be inventoried to determine where ODS allowable leak rates apply based on equipment category and amount of charge. Leak rates are typically determined through refrigerant inventory control (e.g., how much must be added to a system over a given period of time). Leaks from regulated equipment must be repaired within 30 days of discovery or a one-year retirement/retrofit plan must be developed and implemented for the equipment. For all appliances that have a refrigerant charge of more than 50 pounds, the following maximum allowable leak rates for a 12-month period are applicable: commercial refrigeration, 35 percent; industrial process refrigeration, 35 percent; comfort cooling, 15 percent; all other appliances, 15 percent.

Technician Certification

Technicians servicing equipment that contains ODSs must be trained and certified, for the type of equipment they are servicing, by an EPA-approved organization (e.g., small appliance, high pressure, low pressure, universal,

mobile). A list of approved testing programs is available from the EPA Stratospheric Ozone Protection Division. In-person, electronic, and mail-in classes are available. Fees range from free to around $100.

Recovery and Recycling/Reclamation

It is generally illegal to knowingly vent ODSs. When servicing, equipment must be evacuated and the refrigerant must be recovered and recycled on-site, or reclaimed off-site, using equipment certified to meet EPA standards. **NPS policy is to recycle refrigerant on-site where economically and technically feasible.** The EPA has established recovery efficiency standards that vary depending upon the size and type of air conditioning equipment being serviced.

Approved Equipment

Technicians repairing or servicing ODS-containing equipment must use either recover/recycle or recover-only equipment approved by EPA. Recover/recycle equipment cleans the refrigerant so that oil, air, and moisture, contaminants reach acceptably low levels. A certification label is required on the equipment. If equipment is approved by Underwriters Laboratories (UL) and the Air Conditioning and Refrigeration Institute (ARI) (i.e., for stationary sources) and the Mobile Air Conditioning Society (MACS) (i.e., for mobile sources), it will carry the respective organization's symbol on the equipment, and therefore will meet EPA requirements. The Government Services Administration (GSA) Schedule 49 I B offers some of these certified products (call 1-800-848-8928). A listing of authorized reclamation facilities is available from the EPA Stratospheric Ozone Protection Division.

Recordkeeping

The following records are required to be maintained:

- *Certification by Owners*. NPS facilities must certify to the EPA Regional office that they have acquired recovery or recycling equipment and that they are complying with applicable ODS regulatory requirements.
- *Service Records.* Owners/operators of appliances normally containing 50 or more pounds of refrigerant must keep servicing records documenting the date and type of service, as well as the quantity of refrigerant added, for at least three years.
- *Training Certification*. Records of technician training must be maintained at the park.
- *Refrigerant Recycling Records*. The name and address of the recycler, and the amount of refrigerant sent for recycling, must be maintained.

ODS WASTES AND DISPOSAL OF EQUIPMENT CONTAINING ODS

Used Refrigerant and Oil

If refrigerants and refrigerant oils are recycled or reclaimed they are not considered hazardous, provided they are not mixed with other refrigerants, oils, or wastes. The following procedures should be followed:

- Keep recovered refrigerants that are to be reclaimed, or recycled, segregated in clearly labeled containers (e.g. "Used HCFC-22 Refrigerant - To Be Reclaimed").
- Keep waste refrigerant oils that are to be reclaimed, or recycled, segregated from each other and other oils, in clearly labeled containers (e.g., "Used CFC-12 Refrigerant Oil").
- Send the refrigerant oil to an authorized CFC reclaimer, not a normal used oil reclaimer.

Equipment Disposal

Equipment typically dismantled on-site before disposal (e.g., large refrigeration or chiller air conditioning equipment) must be properly evacuated of refrigerant prior to disposal. Equipment such as motor vehicle air conditioners, household refrigerators, freezers, and room air conditioners, can also be evacuated on-site or they can be disposed with the charge intact for recovery later by the disposal vendor. Documentation that the charge was removed should be provided if this option is used.

Halons

Requirements for halon systems are similar to CFC/HCFC systems. The following applies:

- Intentional venting is usually prohibited.
- Technicians servicing halon equipment must be trained.
- Halon recovery equipment does not have to be certified. However, halon and halon-containing equipment must be disposed of in a proper manner. The halon must be recovered and sent to a facility for recycling in accordance with National Fire Protection Association (NFPA) codes 10 and 12A, or destroyed using EPA-approved methods. Proper disposal of halon-containing equipment means only sending such equipment for halon recovery or recycling to a facility (e.g., a manufacturer, a fire equipment dealer, a recycler, or an onsite park recovery and recycling operation) that is operated in accordance with NFPA 10 and 12A.
- Training certification and service recordkeeping is also required for halon fire suppressant systems.

System Plans for the Future

Parks should develop capital equipment plans to eliminate ODSs. Parks should:

- Assess their current inventory of equipment, considering size and type of units, type of refrigerant, and equipment age;
- Develop a plan for the retrofit and/or retirement/replacement of their equipment to use EPA-approved substitutes. The plan should include an assessment of actual park needs. One-to-one equipment replacement may not be necessary given the availability of new, more efficient, technologies, and an accurate assessment of park requirements;
- Ensure that new equipment purchases and maintenance programs are consistent with the plan;
- Consider mobile sources and equipment stock operated by concessioners and contractors as well as the NPS maintained stationary equipment; and
- Consider halon fire suppressant and other ODS uses in addition to refrigerant use.

Contracted Operations and Services

Parks should verify that contractors, concessioners, and service stations that maintain and repair ODS-containing equipment for the park are properly trained, are using EPA certified equipment, and are complying with all other regulatory requirements.

COMMON VIOLATIONS OF CFC REGULATIONS DISCOVERED AT FEDERAL FACILITIES

Several EPA regions have developed a list of common violations that have been discovered during multi-media compliance audits at federal facilities. These lists do not include all program areas addressed by the NPS Environmental Audit Program. However, since EPA has specifically identified these issues as common compliance violations, they are being identified in the appropriate check sheet. Auditors should keep these issues in mind as they review check sheet audit questions. EPA-identified violations regarding the management of CFCs included:

- CFC technicians did not have certification cards on their person (i.e., they do not carry certification cards with them).
- Refrigerant/recovery machines have not been certified with the EPA.
- Purchase invoices for all the refrigerant/recovery machines were not available. (These invoices are necessary for confirmation of the usage start date for such equipment.)
- Careful handling, and proper disposal, of CFC-containing equipment was not evident.

FOR MORE INFORMATION

- EPA Stratospheric Ozone Protection Division. 1-800-296-1996 (Hotline) <http://www.epa.gov/ozone/title6/>
- Air Conditioning and Refrigeration Institute (ARI). 703-524-3322 <http://www.ari.org>
- Air Conditioning Contractors of America (ACCA). 202-483-9370 <http://www.acca.org>
- Association of Home Appliance Manufacturers (AHAM). 312-984-5800 <http://www.aham.org>
- Mobile Air Conditioning Society (MACS). 215-679-2220 <http://www.macsw.org>
- "Just the Facts for MVACs, EPA Regulatory Requirements for Servicing of Motor Vehicle Air Conditioners." http://www.epa.gov/docs/ozone/title6/609/justfax.html
- The Government Services Administration (GSA) Schedule 49 I B list of certified products (1-800-848-8928).

CHECKLIST ITEM	PRIORITY	NOTES
ODS Phase-Out		
1. By evaluating present and future uses of ozone-depleting substances, and maximizing the purchase and use of safe, cost effective, and environmentally preferable alternatives, a plan has been developed to phase-out the procurement of Class I ozone-depleting substances for all non-excepted uses by December 31, 2010. (In lieu of a formal plan, it is acceptable if appropriate park staff can demonstrate they have an inventory of ODS equipment at the park, and are aware of the phase-out requirements. Park staff should also be able to demonstrate that they have educated procurement officers regarding their role in purchasing products or equipment containing ODSs (e.g., replacing air conditioner units).) [EO 13148, Sec. 206]	2	
Motor Vehicle Air Conditioner (MVACs)		
2. Park personnel repairing or servicing MVACs, or MVAC-like appliances, do not perform any repairs involving the refrigerant unless they have received proper training and certification from a technician-certification program approved by the EPA. [40 CFR 82.34(a)(2)]	2	
3. Refrigerant recycling equipment used at the park is certified by EPA. [40 CFR 82.36(a)]	2	
4. Certification has been made to the EPA Regional Administrator that any park personnel repairing or servicing motor vehicle air conditioners have acquired, and are properly using, approved equipment, and that each individual authorized to use the equipment is properly trained and certified. [40 CFR 82.42(a)]	2	
5. Records are maintained indicating the name and address of any facility to which refrigerant is sent. [40 CFR 82.42(b)(1)]	2	
6. Records are maintained demonstrating that all park personnel authorized to operate MVAC refrigerant recycling equipment are properly trained and certified. [40 CFR 82.42(b)(2)]	2	
7. Park personnel do not recover refrigerant from small appliances or MVACs unless the recovery equipment is certified for that particular type of appliance (i.e., equipment used for MVACs are not used for building unit recovery systems). [40 CFR 82.154(f)]	2	
8. Before disposal of small appliances, MVACs, or MVAC-like appliances, any remaining refrigerant is recovered. [40 CFR 82.156(f)]	1	
Non-Mobile Sources, HVAC and Fire Suppression Equipment *The following requirements apply to both CFCs and halons.*		
Releases		
9. Class I or Class II ODSs used as refrigerant are not knowingly vented or released into the environment. [40 CFR 82.154(a)]	1	
10. Used halons are not knowingly vented or released into the environment. [40 CFR 82.270(b)]	1	

CHECKLIST ITEM	PRIORITY	NOTES
11. Leak rates for air conditioning and refrigeration equipment with over 50 pounds of refrigerant are tracked, and leaks greater than the allowable rate are fixed within 30 days or retirement/retrofit plans for the equipment have been developed and executed within one year. The leak rates (represented as a percentage of the total charge leaked in a 12-month period) are as follows: commercial refrigeration, 35 percent; industrial process refrigeration, 35 percent; comfort cooling, 15 percent; and all other appliances, 15 percent. [40 CFR 82.156(i)]	2	
Recovery and Disposal		
12. Refrigerant is evacuated from the entire unit to a recovery or recycling machine before disposal of the unit. [40 CFR 82.156(a)]	1	
13. Halon is recycled, rather than disposed. [40 CFR 82.270(d) and (e)]	2	
14. Different types of refrigerants and refrigerant oils are not mixed. Containers of recovered refrigerants, and refrigerant oils to be recycled or reclaimed, are clearly labeled (e.g., "Used CFC-12 Refrigerant Oil To Be Reclaimed"). [BMP]	3	
15. Recovered refrigerant is only sent to an EPA-approved off-site reclaimer, whose approval status is documented. Records on the amount of refrigerant sent are maintained at the park. [BMP]	3	
16. Different types of waste refrigerant oil are not mixed with other oils, and are sent to an EPA-approved refrigerant reclaimer and not a used oil recycler/reclaimer. [BMP]	3	
17. A plan has been developed and is being implemented to eliminate ODS-containing equipment. This plan should consider stationary and mobile air conditioning equipment, refrigeration equipment, and halon-based fire suppressant systems and fire extinguishers. [BMP]	3	
18. Procedures are in place to verify that contractors, concessioners, and service stations contracted to maintain and repair ODS-containing equipment for the park are trained, certified equipment is used, and all are complying with applicable CFC regulations. [BMP]	3	
Recycling and Recovery Equipment		
19. Recycling and recovery equipment is certified by an approved equipment-testing organization. [40 CFR 82.158(a)]	2	
20. Recycling and recovery equipment used at the park has been properly certified and labeled appropriately. [40 CFR 82 158(h)]	2	
Technician Certification and Training		
21. An approved technician-certification program certifies technicians who maintain, service, or repair ODS-containing appliances. (NOTE: Apprentices are exempt from this requirement provided the apprentice is closely and continually supervised by a certified technician while performing any maintenance, service, repair, or disposal that could reasonably be expected to release refrigerant from appliances into the environment. The supervising certified technician is responsible for ensuring that the apprentice complies with applicable regulations.) [40 CFR 82.161(a)]	2	

CHECKLIST ITEM	PRIORITY	NOTES
22. Training is provided for staff maintaining and repairing halon-containing equipment. [40 CFR 82.270(c)]	2	
Reporting and Recordkeeping		
23. Park staff maintaining, servicing, repairing or disposing of appliances, have certified to the appropriate EPA regional administrator that the park's certified recovery or recycling equipment complies with applicable regulatory requirements. Certification takes the form of a statement signed by the owner of the equipment or another responsible officer and includes: • The name and address of the purchaser of the equipment, including the county name; • The name and address of the establishment where each piece of equipment is, or will be, located; • The number of service trucks (or other vehicles) used to transport technicians and equipment between the establishment and job sites and the field; • The manufacturer name, the date of manufacture, and if applicable, the model and serial number of the equipment; and • A statement that the equipment will be properly used in servicing or disposing of appliances and, that the information given is true and correct. [40 CFR 82.162(a)] (NOTE: Certification requirements for small appliances and MVACs are listed under 40 CFR 162(c).)	2	
24. Individuals servicing appliances normally containing 50 or more pounds of refrigerant provide appropriate park staff with an invoice or other documentation indicating the amount of refrigerant added to the appliance. [40 CFR 82.166 (j)]	2	
25. If a park owns/operates appliances normally containing 50 or more pounds of refrigerant, appropriate staff keep records documenting the date and type of service, as well as the quantity of refrigerant added. Records of the amount of refrigerant purchased and when added to such appliances (in cases where owners add their own refrigerant) must be kept. [40 CFR 82.166 (k)]	2	
26. Certified technicians keep a copy of their training certificate at their place of business. [40 CFR 82.166 (l)] [40 CFR 82.166(l)]	2	
27. If applicable, appropriate staff maintains on-site, and provides to EPA, a copy of the following information regarding leaking ODS-containing appliances: • Identification of the facility; • The leak rate; • The method used to determine the leak rate and full charge; • The date a leak rate of greater than the allowable annual leak rate was discovered; • The location of leaks(s) to the extent determined to date; and • Any repair work that has been completed thus far and the date that work was completed. [40 CFR 82.166 (n)]	2	
28. Records referenced in Questions 10-13 are to be kept for a minimum of three years. If a facility disposes of appliances, those records must be kept on-site. [40 CFR 82.166 (m)]	2	